November, 1956

THE CHEMIST

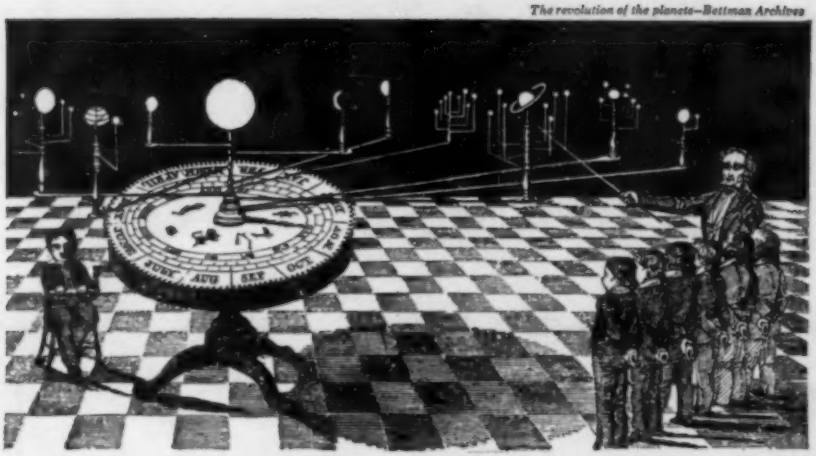
VOLUME XXXIII NUMBER 11

Dr. Charles N. Frey, F.A.I.C.

Receives New York AIC Chapter Honor Scroll

(See Page 429)

The revolution of the planets—Bettman Archives



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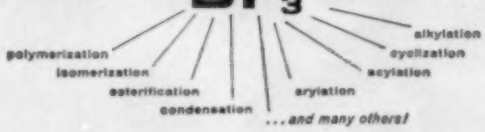

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Communications: The Chemist's Viewpoint, Dr. Johan Bjorksten, F.A.I.C.
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Award of Honorary Membership to Dr. W. George Parks, F.A.I.C.
An Educator Aids the Quest for Knowledge, Lawrence H. Flett, F.A.I.C.

The "pursuit (of science) stimulates the highest faculty of the mind, and its discoveries satisfy the soul in search of beauty." (See page 429.)

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TO COME IN DECEMBER

In this end-of-the-year issue, Dr. C. C. Furnas, assistant secretary of defense for research and development, outlines "The Shape of Things to Come," in which he lists the most important background facts in the world today. He received the Honor Scroll of the Niagara Chapter.

"Communications; The Chemist's Viewpoint," is the title of an eminently practical article by Dr. Johan Bjorksten, F.A.I.C., who covers such subjects as how to make suggestions, present tangible ideas, instruct assistants, even how to ask for a raise!

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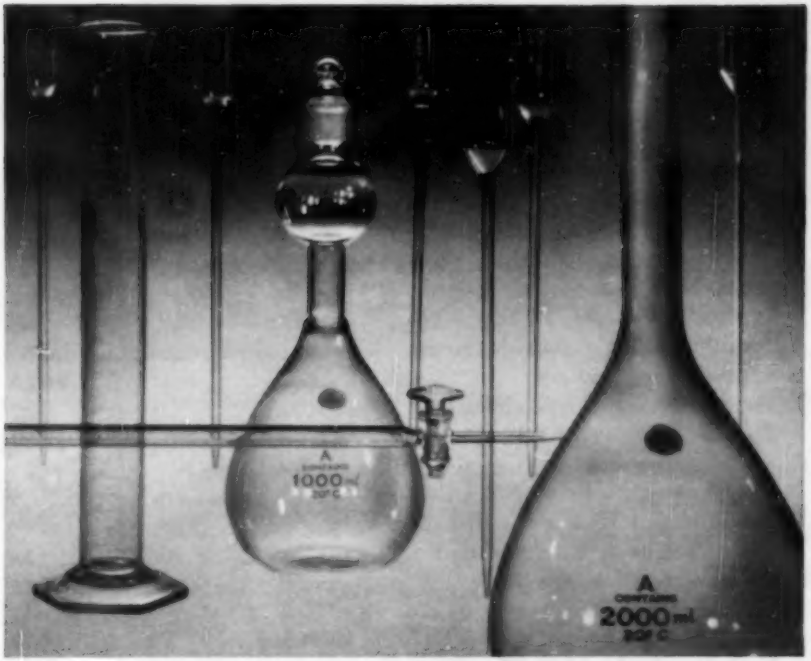

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EDITORIAL

Who Speaks for Scientists?

John H. Nair, F.A.I.C.

ONCE before we asked this question. We raise the point again because we were startled by a paid political advertisement which appeared before the recent election, bearing the 108-point headline:

"HYDROGEN BOMBS"

"Something for you to think about—to do something about"

The entire statement was signed by twelve prominent citizens, not one of whom is a scientist, with the assertion that "the material on this page has been carefully checked with leading Atomic Scientists and Cancer Experts". (All nameless). In discussing the stoppage of all H-bomb testing, they stated that only two issues were involved. "They are the security of the United States against aggression and the health and survival of the human race. Not security versus survival! Not survival versus security!"

In support of their position, excerpts, out of context, from discussions on the terrible effect of radiation were quoted. No scientists were named but in their final point 8, the following statement was made:

"According to James A. Newman, an authoritative (sic) writer on atomic energy; 'QUALIFIED SCIENTISTS BELIEVE THAT WITHIN THE NEXT FIFTEEN YEARS PEOPLE ALL OVER THE GLOBE WILL HAVE TAKEN INTO THEIR BONES FROM MILK, VEGETABLES, AND OTHER FOODSTUFFS, FROM DUST OF FALLOUTS A MAXIMUM PERMISSIBLE DOSE OF RADIUM STRONTIUM'."

Two scientists were named among non-scientists as favoring limitation of H-bomb Tests by international agreement. Additional support of limitation was claimed from "11 physicists on the faculty of Columbia University, 24 scientists at Washington University, 37 members of the faculty of City College," etc., as well as "Present and Former Members of the United States Atomic Energy Commission", (some or all?) Since the statement had switched to "Favor Limitation" from "Favor Elimination," most anyone would have subscribed wholeheartedly.

By now we know how the election went. Apparently the elimination of H-Bomb testing was not a decisive issue. The choice of candidates was made by scientists as citizens plus all other voters of countless vocation, each speaking for himself through the ballot. This is as it should be and in its proper framework. Scientists have every right, and should, express their beliefs personally, by name, on whatever side of any subject of pub-

lic interest they choose. But every scientist, no matter what his beliefs, should resent and oppose the presumptuous use by others of the anonymous voices of scientists. To the layman there is in this an implication of unanimity which may tempt the unscrupulous to make the *profession* a grindstone on which to sharpen axes of political bias.

Special AIC Announcements

Committees to Assist You

The following Committees have been appointed by the National AIC Council, or are specified in the Constitution of the AIC, for the fiscal year 1956-57. AIC members are invited to consult these committees for advice or assistance. Write to the chairman of applicable committee or to the AIC Secretary for transmission to the appropriate committee:

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President Nair's Appointments

On November 27th, AIC President Nair will speak before the Alabama Chapter, in Birmingham, Alabama, on "The New Look in Foods," and on "Professional Status."

The next day, he will meet with the Louisiana Chapter at Tulane University, New Orleans, to discuss, "Attaining Professional Status."

Special Convocation

Lowell Technological Institute, Lowell, Mass., held a special convocation in observance of the Perkin Centennial, September 27th. Dr. A.

W. Fisher, Jr., national AIC councilor, represented THE AMERICAN INSTITUTE OF CHEMISTS at this meeting. In his report, Dr. Fisher stated:

> "The convocation emphasized chemists with Perkin and Olney as the main points of attention. As the founder of the American Association of Textile Chemists and Colorists, Dr. Olney certainly fits into our idea of service to the profession. Dr. Herman Mark's address was excellent and included a demonstration of the synthesis of mauve in the course of his discussion. At this convocation, besides Dr. Mark, the following AIC members were also recipients of honorary Doctor of Science degrees: Sidney M. Edelstein, Fred J. Emmerich, and August Merz."

Twin City Chapter, Welcome!

The application of Fellows of the AIC in the Minneapolis-St. Paul area to form a Twin City Chapter of the INSTITUTE was approved at the October meeting of the AIC National Council. Plans are being made to hold an initial meeting of the Chapter soon, at which President Nair will officially welcome the new Chapter and officers will be elected.

To New Officers Of AIC Chapters

If you do not already have a copy of "Manual of Chapter Operations", please request this from the AIC Secretary, 60 East 42nd St., New York 17, N.Y. It contains much helpful material on procedures.

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Retired: John Francis Williams, F.A.I.C., as chief, Division of Technical Services, Bureau of Customs, where he has served since 1936. Col. Williams commanded the 915th Air Base Security Battalion in the Infantry and Air Corps of the U.S. Army in World War II. His address is 8911 Flower Ave., Silver Spring, Md.

Appointed: Myron B. Diggin, F.A.I.C., as vice president and director of Hanson-Van Winkle-Munning Co., Matawan, N.J. He has been with the company for twenty-five years. He was made assistant vice president in 1954.

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Coordinating Fundamental and Industrial Research

Dr. Charles N. Frey, F.A.I.C.

Consultant, Lecturer, 45 Cambridge Road, Scarsdale, N. Y.

(Acceptance address when the author received the Honor Scroll of the New York AIC Chapter, June 7, 1956, at the Commodore Hotel, New York, N.Y.)

TO those who have spent their lives pursuing a scientific career, the statement of S. H. Tizard in his A. D. Little lecture of 1952 can be appreciated: "Its pursuit stimulates the highest faculty of the mind, and its discoveries satisfy the soul in search of beauty."

"Science does not have an infinite past, and man cannot forecast its future. We do not understand our world or the universe surrounding us. Whatever science finds, contributes to an understanding of the world of things and people. Science gives a surer approach to knowledge, a wider field of vision."* It expands our appreciation of all things, and gives us a broader conception of man's place in nature. It promotes happier modes of living. Science has cultural values that will enrich the humanities. The findings of science encourage us to seek further, to create new knowledge, and to expand our industrial activities. Thus the contributions of science produce a richer and more livable world.

We live in a scientific age, but few men think in terms of science. To many, science is still a disturbing influence, and scientists, as people, are not understood by the public. I recall a verse my daughter passed on to me:

> Said the scientist to the protoplast,
> You are the beginning and I the last
> Of creation's mighty span.
> Said the protoplast to the scientist,
> As he cocked his rudimentary eye,
> If you are evolution's final plan,
> I am very sorry I ever began.

The public sometimes fails to recognize that change and reorientation are the very essence of growth. Life is a continuing stream marked by new perspectives at every turn. Our philosophy must change with the new outlook.

This is a world of endless, elusive change. As the poet Shelley said of the cloud, "I change, but I cannot die." Science has made us conscious of new facts, new relationships, and has given us a storehouse of ideas for our utilization. The full importance of the power of this knowledge, the way to produce new ideas, create new knowledge, and advance technology, the methods by which abstract knowledge can be converted to technology, and the boundless possibilities of technology have not been fully appreciated even in the United States.

The possibilities of modern technology were first realized in Great Brit-

*Frey, Charles N. Scientific and Technical Progress in Yeast and Bread Production. Food Tech. **9**, 211-18 (1955).

ain, but the Germans, about 1870, developed the methods by which pure or abstract science was translated to technology, not by the haphazard methods of the chance inventor, but by the establishment of technological schools where selected scientists were educated. Research laboratories were developed. Here was a type of professionalism that was not static as the old guilds and caste systems had been.

While there are dangers and weaknesses in professionalism, there are advantages in material developments which society can utilize. To prevent abuses, we should aim to develop great men and also a great society; a society with a social life that is not mere existence but with a consciousness of responsibility and with widespread intellectual interest among its members. This is necessary if democracy is to function. There should be balance of intellects and coordination of the specialized functions of its members. Man is human, and specialization in science should not make him sterile in respect to the broad aspects of living.

The transformations that have occurred during the last century have not been imposed by the conqueror. They have come from the inventive genius of men whose intellectual environment was created by a free society, men who worked in laboratories of our universities and colleges and in government and industrial laboratories. "Science," according to Whitehead, "is almost wholly the outgrowth of pleasurable intellectual curiosity."

What Philosophy For Today?

Today we live in the atomic age. Certainly it is potentially a dangerous period. We face the test of our adventure into the unknown. Is the fabric of our society based on a humanistic philosophy, able to meet the tensions that develop among those struggling to obtain power which they have not developed by their own intellectual growth and experience? Can we prevent a frustrated potential Hitler or Stalin from destroying civilization by creating a Goetterdaemmerung with the bombs science has created?

Further complexity arises from the conquest of space. There are no boundaries in the skies. For thousands of years the muscles of the horse or the movement of ships by the winds gauged the speed of our transportation. Today man is neighbor to the world, but he has not learned to translate his knowledge and mores. There is a new undigested, unorganized quality in international intercourse, and in every civilization the meaning of the past has become confused, and the pattern of the future has not been clearly defined and outlined. Man is left without a philosophy to sustain him. The contradictory ideas of continuity and of atomicity in the physical sciences, and the cellular theory of the biochemical sci-

ences find their counterpart in our human relations.

What does this situation mean to the educator and the industrial scientist? What influence does it have on young men and women about to choose their careers? Can we offer young people satisfying careers in the field of science? These questions raise several others which will readily occur to you. I am not able to answer these questions, but I can propose them.

Education is said to be the acquisition of the art of using knowledge. Do our college students meet this yardstick? Are our educational processes adequate for the responsibilities placed upon them? Are we losing too many of the able young teachers to industry, thus weakening the future competence of the staffs? Are university and college facilities sufficiently basic and representative of modern development to provide for proper education? Have we given broad, fundamental work the proper weight in the education of selected personnel? What time should be given to the humanities? Are universities and colleges developing technicians but not a sufficient number of scientists and technologists? Should two-year colleges be established to train students as technicians, thus taking the load from universities, leaving them free to do teaching of selected students and to carry on research?

Directors of research who are responsible for advancing the progress of science in industry and the application of science to industrial operations, in recent years, have generally selected for their staffs men who are thoroughly trained in the fundamental sciences and in mathematics. With the multiplicity of subjects in the modern curriculum, should the period of training be extended, or should a more rigorous training in selected basic subjects be undertaken? Dr. Killian of the Massachusetts Institute of Technology has recently stressed the value of developing men of quality rather than numbers of scientists. He states, "We can win through enterprise, efficiency, and unexcelled quality."

When I was a student many years ago, the individuality of the department and its subject matter were accepted as a well established philosophy of operation. One interested in the biochemistry of microorganisms was more or less on his own. The organic chemist or the physical chemist were seldom concerned with enzyme chemistry, the biochemistry of nitrogen compounds involved in nutrition, or carbohydrate metabolism. There was no approach from chemistry to the studies of metabolism of plants. Botany, zoology, and bacteriology were chiefly descriptive. Mycology and microbiology were concerned mainly with morphology. Biochemistry and modern nutritional work which have become promising fields of research were developed in this

borderland area. Genetics became experimental and mathematical. It required many years to integrate these new fields with the older disciplines. There were many subjects loaded with inert ideas, and these were carried along, a heavy handicap for the student, as well as for the teacher who must have suffered remorse as further progress awakened him to the realization of the inadequacy of his subject matter.

Students often specialized early in their careers and confined their work to limited areas. Many of these men were productive in their chosen fields, but would they have contributed more if they had broadened their interests? Many of the great developments of modern science have failed to enthuse and inspire men who have been too specialized in their education. The new and highly potent tools of science were not utilized. Perhaps some men of the narrow specialized type are necessary in modern industry, but we should not train many students with a limited outlook.

The modern method of organizing a team of workers has been helpful in overcoming some of the limitations of the older practices. The team may be used to carry on a research project, or to investigate a process. There is usually a definite goal, such as the application of recent discoveries in science to the present processes, or the development of new products along conventional lines.

The Demand for Creative Men

Today there is a demand in industry for men of marked creative ability. The universities where research has flourished have developed men of this type. They are needed in the universities, but industry is attracting them by the lure of larger salaries, good working conditions, and more rapid advancement.

The number of men of the highly creative type that can be utilized in an industrial laboratory is difficult to determine. Directors of research are becoming increasingly aware that it is desirable to employ a small number of highly creative individuals who are free to choose their work, work that is not necessarily of immediate, practical application. These men should have time to range the fields of pure science in which they are interested and which are fundamental to the industry that employs them. These scientists stimulate the technologists, and the technologists generally stimulate the pure scientist. Men of high creative ability feel the need of expressing their ideas and fulfilling their aspirations. The environment should give them the atmosphere where creative ideas can flourish. Salaries for the highly creative scientist have in some instances been commensurate with those of scientists who have accepted management responsibilities. It is the function of management to select the personnel fitted to do the work. It must provide facilities, and

exercise perspective in gauging and appraising the significance of contributions from other laboratories.

These experiments in developing the environment for creative activity indicate that industry is adopting methods similar to those obtaining in a university. It has been difficult to justify this policy to the management of certain corporations but if the plan is successful among the better organized industries, it will undoubtedly be followed more widely.

Unevaluated Data Exist

Young men of profound imagination and with thorough education in the fundamentals are being sought by industry. The young men will be assigned to projects or to departments covering specific divisions of science. The number of subjects that must be cultivated by a team carrying on a project taxes the energy of its members, no matter how competent. One of the functions of the director of research and the members of his staff is to develop an acute perception in recognizing the importance to his industry of certain fundamental work in related or unrelated fields and reducing it to practical application in the areas in which the company is operating. There are many fields of science and undoubtedly many ideas and chemical compounds, well known in certain fields, but unknown to the director and his staff, which might have a profound influence on the specific industry in which the director is engaged.

The food industry which takes seventy-billions of our money each year, 18 per cent of the national income, is a vast responsibility. The organization of the scientific information and its use and translation into new industrial projects demands the highest competence. No one can be sure that somewhere data exist that have never been evaluated or their significance to the problem in hand realized. DDT was known many years before its use as an insecticide; ergosterol, the precursor of vitamin D, was isolated from fungi and identified in 1886. In 1926 it was found that this substance could be made an antirachitic by irradiation. Nicotinic acid, the antipellagra vitamin, was known chemically many years before it was found to be effective in pellagra. The effect of molds on bacterial growth had been noted by Pasteur. Fleming pointed out the effect of penicillin in 1929, but penicillin did not become available until 1944. Vitamin B-6 was synthesized in 1938. It appears to have important physiological properties, but it has not been thoroughly studied in respect to the amounts required for the growth of infants, the needs of mature persons, or in the diet of the aged.

The period between discovery and application is often far too long for the type of industrial development we shall have in the future. More

coordination and interchange of ideas among men in various branches of science, and more basic information on the properties of organic compounds required to affect physiological function may tend to shorten the time between discovery and application in the complex areas of food and nutrition research. The time must be reduced in some areas if we are to develop our technology in a rational manner, and maintain our leadership in a competitive world. An industry that does not absorb the newer knowledge as rapidly as it can be reduced to practice is not fulfilling its responsibility to the consumer.

The necessity is evident for thorough understanding of the contributions of fundamental science in a given field and of related fields. These contributions must be evaluated as effectively as human vision and organization can be expected to function. The selection of suitable personnel, each with an alert comprehensive educational background, is of fundamental importance. The future trends must be evaluated and analyzed by the research staff, and adequate facilities for research and reduction to practice should be provided for those projects selected for investigation. This task becomes more difficult year by year. We live in an age where today's research forces yesterday's knowledge and equipment into obsolescence, and modern industry is based on this premise.

The Scholar and the Researcher

Thus scientific research has become a dominant activity of our time. What we develop in the laboratory today becomes the industry of the future. The scholar and the researcher will carry the burden of developing the industrial pattern of tomorrow.

This will require financial support of universities in an ever-increasing degree, and the laboratories of the universities must be manned by the best talent the nation can produce. Dr. Killian estimates $50,000 per student will have to be invested to meet the demands for construction, equipment, and instruments in the new fields. Our universities will require quality students, not primarily quantity. Our high schools should develop and send the talented students to the colleges and universities. The cost of all types of education will increase. Industries are assuming some responsibility in supporting high school and university education. However, this may be but a temporary expedient, although it is extremely important today.

Will these large contributions be taken from dividends or added to the cost of the product? Is it a legitimate charge against production? Should not our society as a whole assume this responsibility? The Rockefeller funds enabled medical men to reorganize our medical schools, but in the course of our social and political development it will be necessary for the citi-

zen to assume responsibilities which far seeing men of wealth assume initially. Support such as Rockefeller gave to medicine and Andrew Carnegie to libraries are examples of the effective work men of wealth have done for a community.

Industrial laboratories will continue to increase in size and in complexity and will be costly to maintain. Expansion to develop new projects will make great demands on industry and on society in general. Staffing these large organizations and coordinating their activities will present vast problems to the directors and to management. To provide an atmosphere where creative activity will flourish and where productivity will be at a high level will require a type of management that has not been operative in all our industries.

No device for creating a research environment and increasing the productiveness and fecundity of fundamental research has been superior to that of the university. Industries will make heavy demands on the universities for men to staff their laboratories, and scientists will seek the industrial environment that gives the greatest promise of fulfilling their ideas in respect to careers in research.

Industry and government should be aware of the necessity of guarding the university laboratories from being warped into control laboratories for projects or of confining the activities too closely to industrial or military ends. Research funds should be contributed for the support of the individual investigator's work. The stimulus of being able to work on the problem of deepest interest to the investigator must be present, and rewards, not only monetary, but social status and honors are involved. These matters need serious consideration. We have the responsibility of leading the world in fundamental research. Western Europe formerly carried the torch. Lack of support financially and lack of vision in planning the future of science in America may be disastrous to the free world.

Consulting Laboratories Needed

Small business may not be able to establish laboratories to meet all its needs, or in all cases to command the talent that large industry can attract. However, there may be an increasing number of consulting laboratories that will be able to specialize in serving specific industries. Operation research teams have been set up in a number of consulting laboratories and institutes. Many of these organizations can command the necessary talent, and with a comprehensive knowledge of a specific industry's problems, their services may be equivalent to that obtained from well-staffed laboratories of larger organizations.

It is not necessarily wise or economic for small industries to attempt to carry on all the research they

require. For example, toxicological research is so specialized that it may be more economical and efficient to utilize service laboratories. Trade association laboratories may also function effectively in covering certain phases of research that are general to the industry and non-competitive. We should not overlook the fact that small laboratories may be very effective and are often able to maintain leadership in spite of competition from larger and better financed organizations. Typical examples are the manufacturers of instruments, electronic devices, flavors, pharmaceuticals, and organic chemicals.

There are many new discoveries which are awaiting development. For example, the food industry is beginning to explore cold sterilization, developed extensively at the Massachusetts Institute of Technology. Here is a field that requires personnel with training not generally found in the food industry. The implementation of this research is being supported by government appropriation and by several industries having specialized facilities.

Government in Research

The place of government in industrial research is difficult to define. Through the establishment of Land Grant Colleges by the Morrell Act of 1862 and subsequent acts which established experiment stations and regional laboratories, government has taken a large responsibility in respect to food and agricultural research. How much of this should be fundamental work, and what part should be application research, may be determined by the trend of industrial development. Certainly there are many types of applied agricultural research which government laboratories can handle most effectively. Government laboratories are seldom in a position to carry on development work of an industrial nature.

The effectiveness of government laboratories in carrying on industrial research for small firms is not definitely established. There are definite limits, especially in some areas. Before the chemical industry began research in the agricultural fields, government laboratories had been successful in developing insecticides and fungicides. In the field of agriculture, the accomplishments have been very definite. New varieties of wheat, corn, and fruits have been developed. Plant and animal disease have been controlled. This work was carried on by the experiment stations, Bureau of Plant Industry, Bureau of Soils, Bureau of Chemistry, and Bureau of Animal Industry. Indirectly, this work was helpful to industry.

The Place of Trade Associations

Trade associations, such as that of the Canners Association, have been effective in developing better methods and in introducing new research ideas into the industry. The Meat Institute is another example of an industrial

group sponsoring research for the benefit of the whole industry and that of the consumer. These activities have been carried on parallel with the research work of government laboratories and of those supported by the meat industry. The fostering of fundamental work by the Nutrition Foundation, which is supported by corporations interested in foods, should be noted. The work of the Food and Drug Administration and of the Bureau of Animal Industry in protecting our food supply has been of great importance to the food industry and to the consumer. The American people have the purest, most nutritious, and the most plentiful supply of food in the world. This did not come about by chance.

A great part of the food consumed by the American people is prepared in the factory. Precooked, frozen and canned foods, and baked goods of all kinds are available. It is estimated that 80 per cent of the food consumed has had some preparation in the processing plant. Close cooperation between the laboratories devoted to fundamental research and the control laboratories connected with food industries is necessary.

Many Services Required By Food Industry

The many problems of preparing foods may not be fully realized by the public. Chemicals are required to assist in processing foods, condition flours, prevent mold growth, prevent oxidation, emulsify fats, promote acidification, improve flavor, and assist in dehydration of foods. Ascorbic acid is used to prevent discoloration of fruits; baking powders and yeast produce aeration or leavening; vitamins are employed to enrich bread, flour and margarine, and shortening manufacturers hydrogenate fats and add vitamins, fatty acids, and emulsifiers to fat. Many other examples could be mentioned. Toxicological studies are required before certain products can be introduced into food. Microbiological investigations cover such subjects as the manufacture of yeast, vinegar, wines, fungal enzymes, fermented foods, and the use of antibiotics in the preservation of food.

Control and fundamental studies on microorganisms, such as spore formers and other types present in food, are carried on. Also these subjects may be mentioned: studies on enzymes and methods of measuring enzyme activity, chemical engineering studies on plant processes or on new processes, baking tests, storage tests at different temperatures and humidity, physical chemical studies on flours, nutritional studies which may involve vitamin studies, utilization of amino acids by the body, amino acid determinations, determination of vitamins by animal assays and by chemical, microbiological, and physical methods, methods for analysis of colors, mineral components of foods, flavor studies, taste testing, starch chemistry, synthetic chemistry in con-

nection with fats and emulsifiers, studies on oxidation inhibitors, use of oxidants in foods, the use of antibiotics in protecting animals and plants from disease and in the prevention of growth of contaminating organisms in raw food products, and the feeding of hormones to animals.

These problems, and many more that could be mentioned, indicate the scope of activities the director may be called on to organize and implement in a large corporation dealing with a wide variety of foods. An alert and well educated staff, thoroughly integrated and responsive to the needs of the company and the consumer, and well aware of the scientific work carried on in universities and government institutions, should be available. The director and his chief assistants should be aware of the requirements involved in meeting government standards and regulations covering foods. Investigators should be familiar with the information available in the patent office and with the procedures used in protecting ideas and developing patent application.

Small organizations with a limited staff may be able to use government laboratories and consulting specialists as the occasion demands. If the quality of the product produced by a firm does not equal that of a competitor, it will not remain on the market indefinitely. Thus every manufacturer is compelled to do his utmost.

The Human Values

One realizes that in the great turbulence caused by developments which the recently integrated scientific discoveries have created, human values have not always been given sympathetic and imaginative consideration. Dr. Raymond Stevens, Hon. AIC, has recently stated as quoted in *Chemical & Engineering News,* "Science and engineering are no longer havens for people who wish to deal with things rather than people." Dr. S. C. Moody, vice president of American Cyanamid, states, "Personnel relations in Cyanamid stresses the need of development of men." He calls this personnel development. The individual must supply the interest and the effort, but the company must maintain an encouraging environment, and translate human assets into the vast power of imagination, knowledge, and dedication.

Dr. Greenewalt, F.A.I.C., president of du Pont, stated recently in *Key to Progress — the Uncommon Man,* and I quote, out of context, "The great problem, the great question is to develop within the framework of the group the creative genius of the individual." And further, "I know of no problem so pressing, of no issue so vital For unless we can guarantee the encouragement and fruitfulness of the uncommon man, the future will lose for all men its virtue, its brightness and its promise."

To accomplish these ends, I believe

we should seriously seek to outline for the student the motives that underlie our society, the moral nature of our civilization and what its foundation is. Kant in his *Critique of Pure Reason* held that it is the inherent feeling of all men that they ought to conduct themselves so as to uphold the world order but they have perfect liberty to do otherwise, the unconditioned law of morality. If we could understand more clearly the attitudes which motivate men, the methods of conducting our relationships of man with man might be greatly improved.

Our scientific advances should be made not by the further isolation of scientists, but by rationalizing science and bringing its philosophy into the education and life of all members of society. Ambassador Conant, Hon. AIC, has prepared an excellent book for this purpose, entitled, *Understanding Science*. Leaders of science and of the humanities may find it desirable to establish a Gordon Research type of conference, a meeting ground where such men as Dr. Warren Weaver, Professor Rabi, and women such as Dr. McIntosh, who have given these matters much thought, can explore with leading humanists the essentials of their philosophy, a meeting ground in which a translation of the spirit and values of each discipline can be attempted. Perhaps from such discussions, certain unifying principles will emerge which will clarify some of the problems facing young people who are trying to develop a philosophy of life, and who wish to dedicate themselves to the work of science and industry.

A little less than one-hundred twenty years ago a Frenchman, De Tocqueville, visited America. Some of his observations are very revealing. He stated, "It would seem as if the rulers of our time sought only to use men in order to make things great; I wish they would try a little more to make great men; that they set less value on the work, and more value upon the workman."

There is no final solution to the problems involved in human relations. The organization of fundamental research laboratories and the coordination of pure and applied research will follow new patterns and will alter with the goals men will seek. Each generation of men faces the evolution and reorientation inherent in the progress of science and social development; it must solve new problems produced by man's expanding power over nature and the new intellectual vistas he unfolds.

Over the space of thirty centuries come the reassuring words of Homer expressing the limitations of the physical body but proclaiming his faith in the cycles of growth that nature has created:

> The race of man is as the race of leaves;
> Of leaves, one generation by the wind is scattered on the earth.
> Another soon in springtime's luxuriant verdure bursts to light.
> So with our race . . .

Presentation of Honor Scroll to Dr. Frey

Dr. Charles N. Frey, F.A.I.C., lecturer and consultant, 45 Cambridge Road, Scarsdale, N.Y., received the Honor Scroll of the New York Chapter of THE AMERICAN INSTITUTE OF CHEMISTS, at its meeting on June 7, 1956, at the Hotel Commodore, New York, N.Y.

Richard L. Moore, then chairman of the New York Chapter, acted as toastmaster. Dr. Randolph T. Major of Merck and Company, introduced Dr. Frey, and read a paper prepared by Dr. Robert R. Williams of the Research Corporation, who was called to Korea just before the meeting. The presentation of the Honor Scroll was made by Dr. Wayne E. Kuhn of The Texas Company, chairman of the Award Committee. Dr. Frey responded with an address on "Coordinating Fundamental and Industrial Research." (See preceding pages.) Preceding the dinner, a reception to Dr. Frey was sponsored by The Standard Brands Corporation.

Dr. Frey was born in Hopkins, Michigan. He was graduated from Michigan State College in 1911, and taught high school science and mathematics for three years. In 1912, he began part-time work with the U. S. Department of Agriculture. He was then employed by the Bureau of Plant Industry. In 1915, 1916, 1917, and one semester of 1919, he was assistant and instructor at the University of Wisconsin, and also worked for the Wisconsin Department of Agriculture. He received the M.S. degree from the University of Wisconsin in 1915, and the Ph.D. degree in 1920. From 1917 to 1919, he served with the Medical Department of the United States Army, Sanitary Corps, as First Lieutenant and Captain.

Dr. Frey was a Fellow of the Yeast Fellowship at the Mellon Institute, 1920-22; research chemist with the Ward Baking Company, 1923-24; research chemist at the Fleischmann Laboratories, 1924-26. In the latter year he became director of the Fleischmann Laboratories. When the Fleischmann Company and the Royal Baking Powder Company were organized as Standard Brands, Inc., he was made director of research of the new company and continued in this position until August, 1944, when he became director of scientific relations. He served in this capacity until his retirement in 1951. At present he is a consultant, and a lecturer at the Massachusetts Institute of Technology.

He has served as section editor of *Chemical Abstracts;* president, American Association of Cereal Chemists, 1941-2; chairman, Agriculture and Food, American Chemical Society; chairman of the New York Section, ACS, 1942-3; director, American Institute, 1935-41; coun-

Dr. Wayne E. Kuhn, Richard L. Moore, and Dr. Charles N. Frey

cilor, Institute of Food Technologists, and president, 1951-2; councilor, The American Institute of Chemists, 1941-3; member of Council, New York Academy of Science, 1948-51; member of Board of Trustees, *Biological Abstracts;* member of Executive Committee, Society of Chemical Industry; member, Program Committee, American Society of Bacteriologists, 1945-6; member of the Food and Nutrition Board, National Research Council, 1942; member of Cereal Committee, Food and Nutrition Board, 1946—; member of Frasch Committee, ACS, 1950—; representative of the State Department, International Technical and Chemical Congress of Agricultural Industries, Belgium 1935, Holland 1937, Hungary 1939.

Michigan State College awarded Dr. Frey an honorary D.Sc. degree in 1946. He was selected as one of the ten outstanding scientists in the study of foods by the Chicago Section, ACS, in 1947. In 1953, he received the Stephen N. Babcock Award, and in 1954, the Nicholas Appert Award.

Dr. Frey's research work has covered nutrition of yeast, enriched bread, vitamin D, vitamins of the B complex, studies on enzymes, fermentation, bacterial and fungal metabolism. He has published about 110 scientific papers and holds over sixty patents.

The citation on the Honor Scroll reads:

To Dr. Charles N. Frey

In recognition of his scientific leadership in food technology and research, the best interest of the public, the advancement of the chemical industry, and the status of our profession have been served well through his many contributions to the literature and his dignified participation in activities for the welfare of the technical arts.

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LABORATORY APPARATUS REAGENTS AND CHEMICALS

Today's Research Environment

National Carbon Company, a division of Union Carbide and Carbon Corporation, officially dedicated its new multi-million dollar research laboratories at Parma, Ohio, on September 18th. Over three-hundred scientists, educators, and industrial leaders who were present at the ceremonies then inspected the new laboratories. Research here covers four major fields: Solid state physics, electrochemistry, carbon and graphite investigation, and the development of high temperature processes and refractory compounds.

Two scientific achievements by the laboratory staff were announced by Dr. Robert G. Breckenridge, director of the laboratories: For the first time, he said, pieces of graphite can be welded together, which may make it possible to prefabricate sheets for the assembly of nuclear reactor moderators, presently built up from graphite blocks. He explained that the welding was done by placing pieces of graphite into an atmosphere of argon gas under high pressure. "The pieces are brought into contact and a direct current passed through them. They are then separated slightly, creating an arc that heats the graphite to extremely high temperatures." The high pressure prevents vaporization of the graphite and thus the pieces are welded together.

Dr. Breckenridge announced that the second achievement was the production of the largest single crystal of cadmium sulfide ever reported. "It has been found that the photo-conducting properties of single crystals are superior to those of a poly-crystalline film, and laboratory crystals ⅛ of an inch in diameter and several inches long have been produced by newly-developed techniques."

Approximately 350 employees, including 150 scientific and technical personnel, work in the beautiful, functional laboratory buildings, which are centered on a low hill in 126-acres of landscaped grounds. The main building contains 158 laboratory modules, or moveable research units, each fully equipped with service lines providing electrical voltages, utilities, and laboratory gases. These facilities were made convenient by backing the research units against long corridors where all but the terminal use portions of the service pipes and lines are concentrated, thus achieving space and privacy for the maintenance of the service facilities. The front of the laboratory units open to glass-sided corridors around the perimeter of the building, in the manner of staterooms opening to a glass-enclosed ship's deck. Wings adjacent to the building house the chemical engineering and furnace areas, machine shop, dispensary, library, cafeteria, locker rooms, boiler and compressor room, administrative and other offices, and an auditorium, which doubles as a projection room

for research on light sources for the motion picture industry. Throughout the research center, the colors of the walls, equipment, floors, and furniture, are those of desert sand—grays, tans, turquoise, soft russets and copper, harmonious colors that do not intrude on mental concentration.

The equipment within the laboratories is as modern as the building. Adger S. Johnson, president of National Carbon Company, stated, "Nuclear furnaces, new high-temperature refractory materials, the miniaturization of electronic equipment, entirely new electrochemical battery systems, and other products, cannot be developed without a thorough knowledge of the molecular, atomic and subatomic makeup of solids . . . The experimental equipment needed for such scientific studies did not exist even a few years ago . . . Twenty years ago, no more than 100 scientists were engaged in solid state physics; today, the field has attracted between 3000 and 4000 researchers." A special feat of carbon-arc engineering is a furnace which contains an intense carbon arc operating at 6000°F, between two focussing parabolic mirrors. Over an area of 2 square millimeters, it produces an energy of 100 watts. Special microwave apparatus measures the spin of electrons, and a new form of electron microscope magnifies up to 10-million times to make molecules visible.

Union Carbide is proud of its success in bridging the gulf between basic research and applied research. Its laboratories, for twenty-five years, have averaged a new product every month. It estimates that ten years elapse between the test tube and the tank car. As Mr. Johnson commented, "The real trick is to put money now into what will pay off in the next generation of executives!" Last year the company invested $47-million in research.

But laboratories must have creative personnel. Dr. James R. Killian, president of Massachusetts Institute of Technology, who gave the dedication address, considered "The New Requirements on Education Imposed by our Advancing Technology." He outlined educational problems and requirements, if industry is to have the increased numbers of creative personnel its growing research program requires. "Union Carbide," he said, "is one of the outstanding examples of a kind of enterprise in which Americans have achieved a special mastery —the combination of innovation and business acumen, the wedding of creative technology with socially responsible, professional management . . . Expanding industrial research bears a symbiotic relationship to our universities. As American society and American industry, in response to an onrushing technology, grow more complex and more dependent upon exceptional talent exceptionally enlightened, our universities find themselves with new duties . . .

"We know that in an age of tech-

nology, the mathematics upon which technology must rest, by some curious distortion of educational judgment, has come to be too widely treated as an unwelcome country cousin in the school curriculum . . . The funds available for basic research in chemistry are meagre indeed, with the result that graduate study in chemistry is handicapped . . . The chemical industry far exceeds all other industries in the U.S. in the amount it expends for basic research in its own laboratories. It is an anomaly that chemistry research in the universities has dropped to an inferior position of support relative to the smaller field of physics.

"If we can solve (these problems and others) industry need have no fear for its technological future or the nation any worry about being outpaced in its intellectual achievement."

The new industrial laboratories of today, such as this of the National Carbon Company, provide a research environment entirely different from that associated with industry in the past. The potential scientist need no longer seek to find if he has the temperament ascribed to chemists by Johann Joachim Becher, who wrote, "The chemists are a strange class of mortals impelled by an almost insane impulse to seek their pleasure among smoke and vapor, soot and flame, poisons and poverty . . ." Today's scientists can make their discoveries in artistic surroundings with the latest of laboratory equipment and library facilities. As Dr. Breckenridge pointed out, "In augmenting a staff of highly competent scientists, supplying the tools of modern research, and providing the most efficient and pleasant working conditions possible, we feel we have established an ideal atmosphere for creative research."

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SCC Medal To Florence Wall

Florence E. Wall, F.A.I.C., consulting chemist, author and lecturer, will receive the medal of the Society of Cosmetic Chemists on December 13th. She is the first woman to receive this medal, which is granted in "recognition of outstanding contributions to the cosmetics field."

Her experience in this field began in 1924, when she joined Inecto, Inc., to pioneer in the scientific development of hair dyes. When the company acquired an affiliate promoting general cosmetics and beauty culture, she extended her activities. In 1936, New York University invited her to organize the first college accredited courses related to cosmetics. Since then she has taught cosmetology at many other educational institutions, including Clemson College, S.C.; Stout Institute, Wis.; Texas University, Oregon State College, and the New York State Department of Education.

During World War II, she was technical editor of the General Aniline and Film Corporation laboratories at Easton, Pa., and later was technical editor for Ralph L. Evans consulting laboratories in New York. She is the author of five textbooks on cosmetics and cosmetology, and has published more than 300 articles.

Miss Wall was one of the first women to become a Fellow of THE AMERICAN INSTITUTE OF CHEMISTS when it was founded in 1923. She was editor of THE CHEMIST during 1929-1931. She has served on the AIC Council and as a member of many of its committees. At present she is chairman of the Committee on AIC History.

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Communications

Suggestion to Enhance Professional Status

To the Editor:

In the September issue of THE CHEMIST, page 376, appears a title heading "Attaining Professional Recognition", relating to a proposed talk by President Nair, and under it the sentence:

"He will show that the younger chemist tends to assume that his employer will recognize his professional status, but that is not necessarily true."

This sentence presumes a professional status in a chemist that may or may not be recognized according to the dictates of an employer.

The question comes to mind, "May or may not an employer recognize the professional status of a licensed M.D. or a licensed lawyer?" The fact is the employer has no choice in the case of a medical doctor or lawyer. But with a chemist, the case is still one of choice on the part of the employer.

The article continues: "The chemist has a responsibility to show by his actions that he is worthy of professional recognition." Hence, the question of worthiness of professional status rests on each chemist and is decided by his employer on an individual basis. In other words, the corporation will recognize some chemists as professional and others as not, as it so chooses.

It is believed that such voluntary and piecemeal or individualistic recognition of professional status is *per se* derogatory of the profession of chemistry.

May I suggest the following employment idea as indicating professional character:

All chemists and engineers and other scientists should insist on contracts of employment paying a salary plus part ownership or at least a percentage of all moneys received on any inventions made, whether or not patented.

Since corporate inventions are made by scientific personnel, such employment contracts would clearly show the intellectual qualities and hence the professional stature of scientists in contrast to other salaried personnel who do no inventing.

—Dr. Frank Makara, F.A.I.C.
New York, N. Y.

Invitation to Assist In Film Project

To the Editor:

A project that we are undertaking is described below . . . Please invite AIC members who have access to films about chemistry, to forward them to Phillips Academy, Andover, Mass., for the purpose of review in this project which is designed ultimately to improve the teaching of secondary school chemistry.

—Elbert C. Weaver, F.A.I.C., *Director, Chemistry Film Project*
Phillips Academy

The project proposes:

Part I. To survey all existing 16-mm films (motion pictures) and 30-mm filmstrips from industrial and educational sources to determine their usefulness in whole or in part for the minimum essentials of an integrated course in high school chemistry on film.

Part II. To make films or filmstrips to fill whatever gaps are discovered by the survey undertaken in Part I.

Purpose: It is anticipated that by puting on film enough material to occupy approximately one-half of the time spent in class work in elementary chemistry (1) the usefulness of an experienced teacher of chemistry can be extended to more students, (2) the presentation of chemistry by a teacher of less strong training, or by one who lacks apparatus or experience in the art of classroom demonstrations, or who is somewhat isolated, will be strengthened.

In general, the project is an attempt to meet the need for better and more widespread chemistry teaching in the secondary schools.

Method: To review all existing material related to chemistry now on motion picture films or on filmstrips, to evaluate same, and to correlate it with the high school chemistry curriculum.

Enjoyed

To the Editor:

I have enjoyed reading copies of THE CHEMIST.

—Dr. Belle Otto
Chicago, Ill.

Opportunities

Doris Eager, M.A.I.C.

AIC members who are seeking positions may place notices in this column without charge.

Positions Available

Supervisory production man with experience in the calendarizing of vinyl sheeting. To take charge of plant and personnel. Age 35-50. Opportunity. Salary open. Box 111, THE CHEMIST.

Chemist for development work on consumer products. Require minimum B.S. plus two years' experience. Please include resume and salary requirements in reply to Box 113, THE CHEMIST.

Research Chemist: For West Coast opening in industrial chemicals, detergents and cleaning compounds. B.S. degree, preferably, M.S. Up to five years research and application experience in surface chemistry, preferably in the metal cleaning and metal finishing field. Age 28 to 35. Salary $7,000-$8,500, plus benefits. Box 115, THE CHEMIST.

Chemist: Female. College graduate, major in chemistry. Six months' to one years' experience, preferably in the food field. Hearst Magazines, 309 West 56th St., New York 19, N.Y.

U.S. Civil Service Commission announces applications are being accepted for **Engineer & Physical Science** positions Potomac River Naval Command, and in Washington, D.C., also in Engineer Center, U.S. Army, Fort Belvoir, Va. Salaries range from $4,480 to $11,610. Details from U.S. Civil Service Commission, Washington 25, D.C.

Examination for **Chemist.** Positions in Communicable Disease Center, in Atlanta, Ga. and other locations throughout country, for those with appropriate education and experience. Entrance salaries range from $5,550 to $11,610 a year. Apply to Board of U.S. Civil Service Examiners, Communicable Disease Center, 50 Seventh St. N.E., Atlanta 23, Georgia.

Chemists Available

Pharmaceutical & Cosmetic Technical Executive. 10 years' diversified experience: 5 years Pharmaceutical & Cosmetic Technical Service Administrator (Basic raw and processed bulk materials); 5 years Director Pharmaceutical Research and Development (Pharmaceutical & Cosmetic Manufacturers). Pharmacy & advanced degrees. Age 34. Excellent references. Available January first. Box 110, THE CHEMIST.

Food Chemist. M.S. Young, bright chemist. 6 yrs. successful experience in research & development at the bench and at management level. Experience in wide variety of practical & academic problems related to food products, processes, etc. Patents & Publications. Seeks place on management team of progressive food or allied company. Box 112, THE CHEMIST.

Chemist. B.A. in Chemistry. 13 years' broad experience in analytical and physical chemistry. Some literature searching and research. 36 years old. Married with family. Desire responsible position with salary of $6,000 or more. Box 114, THE CHEMIST.

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AIC Activities

Chicago Chapter

Chairman, Dr. Edmund Field
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10 West 33rd St., Chicago 16, Ill.
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News Briefs

The *Newsletter* of the Chicago Chapter contains the following items about members:

"Mr. Al Hester, our publicity chairman, who deserves much credit for promotion of this year's Honor Scroll Award Banquet, is leaving us shortly to serve a tour of duty in London for the A.C.S. We offer him our congratulations and best wishes, but also regret the departure of such an active member."

"Dr. Herman Bloch has been appointed the Chicago Chapter representative to the National Committee on Long Range Meetings."

"Dr. R. L. Bond, formerly with the Armour Research Foundation, has been named manager of research and development at Tennessee Corporation."

"Dr. Joseph Matt has returned to the Mid-West, after a brief tour of duty with Virginia Carolina Chemical Co., to accept

the position of research director at Alkydol Laboratories, Inc., of Cicero. Dr. Matt was formerly associated with Armour and Company."

Dr. Henry R. Kraybill

"It is with deep regret that we announce the recent passing of Dr. Henry R. Kraybill, Vice-President of Research of the American Meat Institute. Dr. Kraybill was most recently honored in June with an honorary D.Sc. by Purdue University and posthumously in October with the 1956 Dodge and Olcott Award in food chemistry. One of his many activities included serving as chairman of our local AIC Chapter during 1945-46."

New Jersey Chapter

Chairman, Dr. Max Bender
Chairman-elect, Dr. William R. Sullivan
Secretary, Dr. John F. Mahoney
1000 Woodmere Drive,
Westfield, N.J.
Treasurer, Dr. Curt Bamberger
National Council Representative,
Dr. Cecil L. Brown

President Nair Speaks on Professional Recognition

The New Jersey Chapter held its first meeting of the season, Oct. 23, 1956, at the Military Park Hotel, Newark. AIC president John H. Nair, assistant director of research, Thomas J. Lipton & Sons, Inc., Hoboken, N. J., spoke on the subject, "Attaining Professional Recognition."

Mr. Nair indicated that (a) the status of the chemist and chemical engineer has improved immensely in the last 25-years, but (b) general recognition of the scientist as a professional within the community has not improved to the same degree. This fact remains despite the annual expenditure of 4-billion dollars for scientific research.

According to Mr. Nair, one way for the scientist to obtain wider recognition within his community is for the technically trained individual to be more active in local service clubs, civic affairs, boards of education, and in general service to his community. The employer too can help and also meet the increasing shortage of professional scientists, as related to the above expenditure, by the employment of more technicians, as assistants, to perform the routine duties of the professional. A ratio of three technicians to each professional, as opposed to the present ratio of one to one, was suggested by Mr. Nair as a more ideal proportion. Thus, society in general will benefit and the scientist, himself, will be happier in his work. Mr. Nair concluded by suggesting that greater recognition by the employer of the contribution of scientists will also attract the younger prospective students of science into the field where there is heavy demand.

This general meeting was preceded by a dinner and a meeting of the council committee members and others active in the local Chapter. Dr. Max Bender, chairman, and research scientist, American Cyanamid Co., Bound Brook, conducted the business meeting and heard reports from the following committees:

Education
C. A. Amick, Chairman

Honor Scroll
Dr. D. L. Cottle, Chairman

House
James E. Abel, Chairman

Membership
Dr. F. A. Gajewski and Dr. L. T. Eby, Co-chairmen

Nominating
Dr. Cecil L. Brown, Chairman

Professional Advancement
Dr. J. B. Allison, Chairman

Program
Dr. F. A. Lowenheim, Chairman

Student Awards
Dr. R. H. Seavy, Chairman

The next Council and public meeting, on the subject of Education, will be held in January, 1957, at the Military Park Hotel, Newark, N.J. For information or reservations, please contact Dr. F. A. Lowenheim, P.O. Box 471, Rahway, N.J.

Washington Chapter

President, Wesley R. Koster
Vice President, John G. Fletcher
Secretary, Frederick S. Magnusson
Bureau of Foreign Commerce,
U. S. Department of Commerce,
Washington 25, D.C.

Treasurer, Albert F. Parks
National Council Representative,
Wesley R. Koster

Science Careers

The first meeting of the Washington Chapter for the season was held Oct. 13, 1956, at O'Donnell's Sea Grill. President Koster reviewed some of the recent activities of the AIC, including mention of the National Committees. He announced the appointment of the following Chapter committees:

Program and Orientation
Dr. Anthony M. Schwartz, Chairman
William E. Bailey
Paul Gomery
Dr. Richard L. Kenyon

Chapter Analysis
Charles B. Broeg, Chairman
A. D. Etienne
Arthur Schroder
Frank Wilder

Legislation and Standards
Paul E. Reichardt, Chairman
Fred S. Magnusson
Alexander P. Mathers
Albert F. Parks

Membership
Maynard Pro, Chairman
Robert C. Watson
James A. Lawson
John G. Fletcher

Awards
Dr. Carl J. Wessel, Chairman
Dr. Edward Farber
Miss Elizabeth Hewston
James Kanegis

Dr. William E. Chace, director of education of the Manufacturing Chemists' Association, spoke on the steps taken to date by the Association in promoting interest in science careers among young people. So far, this effort has been directed principally toward the Junior High Schools in the form of printed literature, posters, and teaching aids. Dr. Chace explained that if the program is carried forward in subsequent years, efforts will then be moved up to high school and college levels. Some of the difficulties of launching the program, and its future prospects, were of great interest to the Chapter members present. It was stated that the Washingon Chapter might wish to cooperate in this movement locally, by discussion of the problem with local school officials and devising a method of assistance.

Louisiana Chapter

Chairman, Caroll L. Hoffpauir
Vice-chairman, Dr. Winston R. de Monsabert
Secretary-Treasurer, Mack F. Stansbury
Southern Regional Research Lab.
1100 Robert E. Lee Blvd., New Orleans, La.
Representative to National Council,
Harold A. Levey

Committees

The Louisiana Chapter has appointed the following Committees for 1956-57:

Program
Dr. Carl M. Conrad, Chairman

Membership
Mack F. Stansbury, Chairman

Archives
Harold A. Levey, Chairman

Awards
Winston R. de Monsabert, Chairman

Professional Education
Dr. J. David Reid, Chairman

Public Relations & Legislation
Joshua D. Smith

Will You Come

Dec. 6, 1956. Pennsylvania Chapter jointly with the Philadelphia sections of the American Chemical Society, The American Institute of Chemical Engineers, and the Electrochemical Society. Meeting at the University of Pennsylvania Museum, Philadelphia, Pa. at 2 p.m. for afternoon symposium on "Scientific Manpower—its Meaning to the Scientist and the Nation." Speakers: Dr. Christopher Wilson, vice president, Hudson Foam Latex Corp.; Dr. Eli Ginzberg, professor of economics, Columbia University; Dr. Harry C. Kelly, assistant director, National Science Foundation. Moderator: Dr. Norman A. Shepard, former chemical director, American Cyanamid Co. Symposium followed at 6 p.m. by cocktail hour.

Dinner, 7 p.m. Speaker: A prominent member of the Department of Defense will discuss the problems facing the scientist in the future.

Dec. 12, 1956. National AIC Council and Board of Directors. Dinner Meeting. The Chemists' Club, 52 East 41st St., New York 17, N. Y.

Jan. 1957. (Date to be announced). New Jersey Chapter. Dinner and meeting, Military Park Hotel, Newark, N.J. Subject: Education. Speakers to be announced. For information: Dr. F. A. Lowenheim, P.O. Box 471, Rahway, N.J.

Jan. 10, 1957. Pennsylvania Chapter. Penn Sherwood Hotel, Philadelphia, Pa. Reception, 6:30 p.m. Dinner, 7:30 p.m. Annual Honor Scroll Award dinner. Dr. Charles L. Thomas, F.A.I.C., outstanding chemical engineer, will be honored for his outstanding contributions to the profession of chemistry. For information, Dr. A. M. Immediata, International Resistance Corp., 401 No. Broad St., Philadelphia, Pa.

Feb. 8, 1957. New York Chapter. Joint meeting with American Chemical Socitey. Program to be announced.

Feb. 13, 1957. National AIC Council and Board of Directors, Dinner meeting. The Chemists' Club, 52 East 41st St., New York 17, N.Y.

Feb. 26, 1957. New Jersey Chapter. Plant Trip. Visit to RCA Research Laboratories, Princeton, N.J. 2:00 p.m. Registration required prior to plant visit.

Mar. 7, 1957. New York Chapter. Presentation of Honorary AIC Membership to Lawrence H. Flett, formerly AIC president. Details to be announced.

April 4, 1957. New York Chapter. Young Chemists' Meeting. Program to be announced.

May 1957. (Date to be announced) New Jersey Chapter. Military Park Hotel, Newark, N. J. Cocktails 6 p.m., dinner 7:00 p.m. Annual awards, program and speaker. Student medals will be presented to outstanding students of chemistry in the New Jersey Chapter area.

May 21, 1957. National AIC Council and Board of Directors. Dinner Meeting. Sheraton-Mayflower Hotel, Akron, Ohio.

May 22-24, 1957. Thirty-fourth Annual Meeting. THE AMERICAN INSTITUTE OF CHEMISTS. Sheraton-Mayflower Hotel, Akron, Ohio.

June 6, 1957. New York Chapter. Honor Scroll Award meeting. Program to be announced.

April 10-11, 1958. Thirty-fifth Annual Meeting. The AMERICAN INSTITUTE OF CHEMISTS. Los Angeles, California. Host: The Western AIC Chapter.

May 14-15, 1959. Thirty-sixth Annual MEETING. THE AMERICAN INSTITUTE OF CHEMISTS, New York, N. Y. Host: The New York AIC Chapter.

For Record: AIC Meetings Held in November

Nov. 8, 1956. New York Chapter jointly with Chemical Industry Association. Belmont Plaza Hotel, New York, N.Y. Subject, "The Chemist, the Industry, and National Defense." Speaker, Simon Askin, president, Heyden Chemical Co.

Nov. 9, 1956. Chicago Chapter. Chicago Engineers Club. Subject, "Education for Engineers: The Notre Dame Self-study." Speaker, Prof. James P. Danehy, Chemistry Department of Notre Dame.

Nov. 13, 1956. Washington Chapter. Luncheon. O'Donnell's Sea Grill, Washington, D.C. Speaker: Dr. B. R. Stanerson of the American Chemical Society. Subject, "The Economic Status of Chemists."

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For Your Library

Principles of Fungicidal Action

By James A. Horsfall, Ph.D. The Chronica Botanica Co., Waltham, Mass. Hafner Publishing Co. New York. 1956. 279 *pp.* $6.50.

The attractive pen drawing by Margaret M. Kendall which serves as frontispiece of this Vol. 30 of the new series of Plant Science Books edited by Frans Verdoon, shows the spiral plots at the field station of the Connecticut Agricultural Experiment Station of which Dr. Horsfall is the director. It sets the tone for a scientific treatise completely lacking in dryness though rich in factual material. Dr. Horsfall has enriched his comprehensive presentation of all the information currently available on the mechanisms of fungicidal action by the inclusion of interesting historical data.

A long bibliography, general and author indices are appended to make this a valuable addition to the library of all interested in this subject.

—Dr. Frederick A. Hessel, F.A.I.C.

Determination of Organic Compounds

By K. G. Stone, Associate Professor of Chemistry, Michigan University. McGraw-Hill, N.Y. 233 *pp.* 6" x 9" (8vo) $5.00.

A textbook for students and teachers. Well worth consideration in setting up a course in organic analysis. Members of the AIC who are in teaching would do well to examine this book. Each chapter has a set of problems which illustrates the information well. The teacher should work these out for himself, that other problems may come to mind. (As no answers are supplied with the text, this will be necessary!)

The book is well written and clearly expresses the ideas it presents. The paragraphs are often crammed with data, which is a great advantage in teaching as it permits the suggestion of specialized texts, as well as enabling the teacher to enlarge on the subject.) This satisfactory text for organic analysis gives more attention to chemistry than to instruments, which is proper. Lots of information per paragraph and per sentence.

—John B. Lewis, F.A.I.C.

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Fluidization

Dr. Donald F. Othmer, F.A.I.C, Editor. Reinhold Publishing Corp. 1956. 256 *pp.* $7.00.

Contributors are R. F. Benenati, Ju Chin Chu, F. A. Zenz, E. J. Gohr, R. M. Braca and A. A. Fried, R. W. Krebs, Clyde Berg, W. W. Kraft, W. Ullrich, and W. O'Connor, and R. B. Thompson, and the contents are the complete papers presented at a symposium on fluidization held at Polytechnic Institute of Brooklyn in cooperation with the American Institute of Chemical Engineers. The theory, practice and commercial applications of fluidization are given in summary treatment, and the book is replete with detailed observations on operation and control.

—Dr. John A. Steffens, F.A.I.C.

Chemical Books Abroad

Dr. Rudolph Seiden, F.A.I.C.

Akademische Verlagsgesellschaft Geest & Portig, Leipzig C.1: *Grundlagen der Chemie und chemischen Technologie des Holzes,* by W. Sandermann; 1956; 510 pp. (221 ill., 134 tables); DM 48—An authoritative textbook covering the entire field of wood chemistry and technology, with emphasis on historical data and economical trends. Modern preparative and analytical methods are described in detail (80 pp). • *Ueber eine neue Methode, die Natur und die Bewegung der elektrischen Materie zu erforschen;* by H. Pupke; 1956; 64 pp. (6 ill.); paperbound DM 6—A biography of Georg Christoph Lichtenberg, with a translation of his reports on the discovery of the electrical (Lichtenberg) figures.

Franckh'sche Verlagshandlung, Stuttgart-o: *Welches Holz ist das?*, by A. Schwankl; 4th ed.; 146 pp. (158 ill., 10 tables, 40 wood samples); DM 15—This unique book provides every step necessary for a clear understanding of the more important kinds of wood found in various parts of the world and for their identification. Most helpful are the original wood samples which show better than words or pictures the beauty and characteristics of widely used veneers.

Eduard Roether Verlag, Darmstadt: *Technisches Woerterbuch — Zellstoff und Papier*, by W. Mohrberg; 1955; 2 vol., each DM 25.—This technical dictionary of pulp and paper includes also the terminology of the printing, processing, and carton manufacturing and corresponding machine industries as well as the respective commercial expressions. Both volumes (I, *English-German*, 223 pp. and II, *German-English*, 226 pp.) are exquisite in print, paper, and binding.

Verlag Rudolph Schmidt, Berlin Konradschoehe: *Oil Dictionary*, by F. Persch; 1955; 415 pp.; DM 34.—10,700 terms related to all phases of the (mineral) oil industry—drilling, transportation, refining, and storage—have been compiled by an experienced oil-fielder in this handy English-German dictionary.

Verlag Chemie, Weinheim/Bergstr.: *Kolorimetrische Analyse*, by B. Lange; 5th ed.; 506 pp. (148 ill.; 18 tables); DM 29.—Since the 4th ed. of this book was reviewed in THE CHEMIST (May, 1953), the colorimetric know-how has grown; almost 100 pages were added to the text, dealing particularly with flame photometry, chromatography, and new types of instruments, e.g., the Golay detector, and last but not least numerous colorimetric methods and their application in industry, medicine, and biology. • *Beitraege zur Geschichte der Technologie und der Alchemie*, by W. Ganzmueller; 1956; 389 pp. (26 ill.); DM 29—In 2 separate parts this survey deals with the history (1) of glass and glass making since the 14th century, bringing old formulas, biographies of famous glass makers, and descriptions of equipment for glass making and (2) of alchemy of the middle ages in general, with many letters, literature excerpts, description of laboratories, etc.

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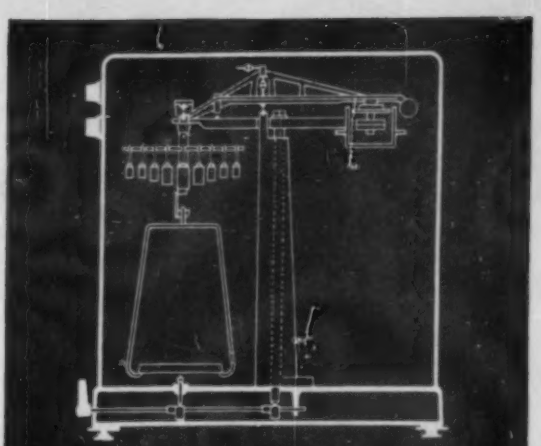

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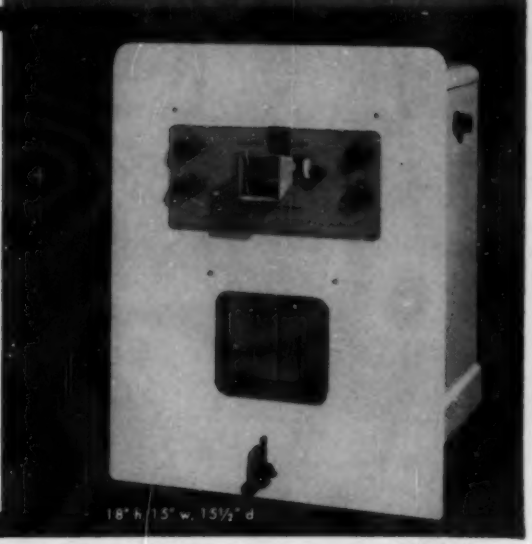

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